

ABSTRACT OF THE DISCLOSURE

Methods and apparatus for measuring entrained gas content. One of the disclosed apparatus embodiments includes a chamber and piping for process fluid, the piping including two different sectors each comprising a density and temperature gauge having a pressure gauge located upstream and a second pressure gauge located downstream, the two sectors being operatively joined together by a pressure-changing device. The pressure measurement feature may be incorporated into the combination density and temperature gauge, eliminating the need for separate pressure gauges. Data generated by this invention reduces measurement error caused by the dissolving or exsolving of gases with changes in pressure of a fluid, while providing instantaneous measurement, through apparatuses that measure system conditions at each of two pressure states within a very short period of time. For instance, in the context of continuously coating a substrate, the method of this invention comprises: a.) setting a quantitative target for weight-% of one or more solids, e.g. kaolin clay, calcium carbonate, titanium dioxide, or alumina trihydrate, to be coated onto a substrate such as a paper web; b.) continuously applying the solids to the substrate via a carrier fluid; c.) measuring the apparent density of the slurry; d.) determining the true density of the slurry; e.) calculating the weight-% of solids in the slurry as disclosed above; f.) comparing the calculated weight-% solids to the target weight-% solids; and, g.) if the calculated weight-% is greater or less than the target weight-%, lowering or raising the amount of solids applied in step b.). Many other method and apparatus embodiments are also disclosed.